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MICROTRIMERIA COCKERELLI, A NEW GENUS AND SPECIES OF SOUTH AMERICAN MASARIDS (HYMENOPTERA)

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The wasp to be described in the present paper presents a number of features of more than usual interest. It not only adds one more species to the very small number of Masaridinæ known from the Neotropical Region; but it also extends the range of this subfamily of wasps to entirely new territory. Moreover, it differs in so many respects from the described members of the group, that it represents a distinct natural division, which I believe is of equal rank with the several genera that are at present recognized in this subfamily.

Microtrimeria, new genus.

Finely sculptured species. Eye with a deep, triangular sinus. Clypeus shallowly emarginate at apex. Mouthparts apparently as in *Trimeria*, in so far as they can be seen without dissection: labrum short; labial palpi of 3 long segments; maxillary palpi rudimentary or absent. Antenna (in female) of 12 distinct segments; flagellum uniformly fusiform throughout, the apical segments not set off as a club. Parapsidal furrows present, complete. Tegula elongate, its posterior lobe reaching the base of the scutellum. Scutellum with a median, raised portion and a lateral, depressed rim, completely covering the postscutellum when seen from above. Posterior surface of propodeum vertical; its lateral angles broadly rounded, not mucronate. Middle

tibia with two apical spurs; larger posterior tibial spur trifid at apex. Tarsal claws simple. Abdomen sessile; tergites not conspicuously divided into a basal, constricted and an apical, wider portion. Forewing not plaited; venation as in *Trimeria*.

Genotype: *Microtrimeria cockerelli*, new species.

Microtrimeria cockerelli, new species (Fig. 1).

A small, minutely sculptured species; black, with numerous ivory-white markings and slightly amber-yellow wings; fasciæ of the abdomen deeply bisinuate.

Total length: ♀, 7.5 mm.; of wing, 5 mm.

Female.—Head broadly elliptical in front view, about one and one-fifth times as wide as high; seen from above, a little less than twice as wide as long, not broader than the thorax; occipital margin almost straight. Vertex and cheeks margined throughout by a sharp, even carina. Cheeks wide and distinctly swollen in their upper half, where they are still much narrower than the upper part of the eye in profile and are not in the least angular; gradually narrowed in their lower half, which is not

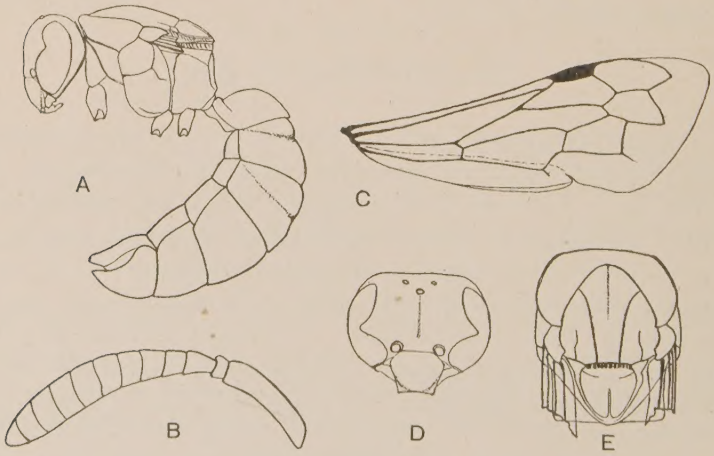

Fig. 1. *Microtrimeria cockerelli* J. Bequaert. Female: A, body in profile; B, antenna; C, fore wing; D, head in front view; E, thorax from above.

depressed; the marginal carina broadly and evenly rounded, not forming an angle. Inner orbits about one and one-third times as far apart on the vertex as at the clypeus. Front hardly swollen, with a slight longitudinal median groove over its upper two-thirds, beginning at the anterior ocellus. Ocelli large, in a flattened triangle; the posterior pair a little nearer to each other than to the inner orbits, about twice as far apart as they are from the anterior ocellus and about equally distant from the occipital margin as from the inner orbits. Interocellar area flat. Vertex not swollen, without fovea. Antennæ about five times as far apart as they are from the inner orbits; the area between them flat, without ridge, carina or depression. Clypeus irregularly hexagonal, with longer upper and lower margins, but little wider than long, very slightly convex in the middle, flattened toward the base, moderately depressed on the sides in its apical third, but without lateral grooves; the anterior, free portion a little longer than the basal, interocular part; the upper margin straight; the lateral margins forming rounded angles which are far removed from the inner orbits; the truncate apex about three-quarters of the maximum width of the clypeus, margined by a narrow, thickened rim, with a slight inward curve, forming right angles with the lateral margins; the lateral angles blunt, flat; owing to the sides of the clypeus being depressed at the apex, the apical margin appears triangularly emarginate when the head is seen from below. Antenna short, of twelve segments; the flagellum much swollen, gradually incrassate from the base to about the middle; scape almost uniformly swollen throughout, nearly half the length of the flagellum; second segment small; third segment about twice as long as the second, about one and one-third times as long as wide at the apex; the fourth a little over half the length of the third, wider than long; the fifth to eleventh much wider than long; the twelfth about as long as wide, bluntly rounded at apex; all the segments perfectly normal. Mandibles of the knife-like type, somewhat decussate, much shorter than the length of the eye, stout and but little curved; the apex forming a blunt, broadly rounded tooth; the inner margin with two shallow notches separating low, blunt teeth; the notches being the ends of two deep grooves which run over

the outer surface of the mandible to near its base. Thorax rectangular, stubby, slightly narrowed anteriorly and a little more posteriorly; about one and one-fifth times as long as its greatest width and about as high as wide. Anterior margin of pronotum with a very slight outward curve, rounded off, without carina or rim; the humeral angle not projecting, broadly rounded; the lateral margin broadly curved and with a fine, sharp carina extending from the humeral angle to the mesopleuron and forming the upper border of the epicnemia for the front legs. Mesonotum but little longer than wide, pentagonal in outline with the anterior third produced and the anterior angle semicircularly rounded; very slightly and uniformly convex; with deep, continuous parapsidal furrows and a finer, incomplete furrow on each side in the posterior third and parallel with the tegulæ; a fine median impressed line in the anterior half. Tegulæ much longer than wide, narrowed posteriorly, reaching the base of the scutellum on the sides; post-tegulæ not developed. Scutellum very large, broadly triangular, completely covering the postscutellum, which is hidden when looked at from above, with a median, raised portion, the margin of which is thickened and connected at the apex with a slight, median, longitudinal ridge which runs over the apical two-thirds; on each side of this median ridge the surface of the scutellum is flattened, but not distinctly grooved; the base is deeply depressed and the mesonotal suture bears a number of foveolæ; the marginal area of the scutellum forms an abruptly depressed, flat plate, which is broad on the sides and narrows gradually toward the apex, where it is but indistinctly divided from the median, raised area. Postscutellum very short, transversely elliptical, not visible from above; its surface vertical and in a plane with the concavity of the propodeum. Mesepisternum divided from the epimeron and with a complete suture separating the upper from the lower plate; anterior and posterior areas of the mesopleura abruptly constricted to form the edges of deep epicnemia for the front and middle legs; these depressions, however, not bordered by sharp prepectal carinæ (as in the case in *Trimeria buyssoni*); no prepectal suture is present, but the impressed line which marks the sternopleural suture is well marked. Propodeum short, squarely

and vertically truncate behind, not swollen on the sides; dorsal areas broadly separated from each other by the postscutellum; concavity wide and shallowly depressed, with a fine, longitudinal median carina which runs from the postscutellum to the much thickened lower (apical) margin; superior, lateral and inferior ridges broadly rounded; lateral angles not produced, rounded; ventral areas fused with the metapleura. Lateral scales of the articulation of the abdomen narrow, broadly rounded. Abdomen moderately elongate, of almost normal shape, the several segments not conspicuously constricted basally. First tergite transverse, as wide as the second, broadly rounded in profile and not angular between the anterior, sloping part and the posterior, horizontal area; the horizontal portion about three times as wide as long. Second and third tergites with a slightly depressed, transverse line (or constriction) in or before the middle, more pronounced on the second tergite; last tergite normally convex; all the sternites normal, the apical one convex throughout, with a deep, narrow notch at apex; apex of first to fifth tergites with a narrow, translucent margin, which, however, is not raised nor set off by puncturation. Legs moderately stout, of normal shape; middle femora and tibiæ not appreciably swollen nor flattened; all coxæ and trochanters unarmed and of normal shape; front tarsi of normal shape, slender; anterior tibial spur strongly curved, slender, acute; middle tibia with two spurs of unequal length; larger posterior spur trifid at apex; tarsal claws simple. Wings with the venation of *Trimeria*: two closed submarginal cells; the medio-cubital cross-vein (*m-cu*) attached basad of the submedian vein ($M4+Cu$); radial cell very broad, not appendiculate; forewing not plaited; posterior lobe of hind wing well developed.

Body entirely covered with dense, microscopic puncturation (not visible with a hand lens); in addition with scattered fine punctures, which become larger, deeper and denser on the thorax and still coarser over the raised portion of the scutellum; the depressed apical margin of the scutellum with fine longitudinal striæ. The puncturation is still distinct on the first tergite, but becomes very faint and sparse on the succeeding tergites and on the sternites. Apical half of the clypeus granular. Head and

thorax dull, the abdomen a little more shiny. Pilosity very sparse and short, grayish.

Black. Apical half of the mandibles, inner side of the front femora, inner side of all tibiæ, tibial spurs, tarsi, center of tegulæ, and extreme apex of abdomen, more or less ferruginous. The following markings are ivory-white: a transverse spot covering the upper third of the clypeus; upper two-thirds of the inner orbits, including the ocular sinus and extending to opposite the posterior ocelli; upper half of the cheeks (broadly separated from the white inner orbits); broad anterior margin of the pronotum (a little produced behind on the sides, but not reaching the mesopleura); a small triangular spot in the hind corner of the pronotum, close to the tegula; a median, rectangular spot in the posterior third of the mesonotum (between the parapsidal furrows); a line on each side of the mesonotum, close to the tegula; scutellum (except for the apical, depressed rim and a broad, semicircular, basal spot); entire upper plate of the mesepisternum; dorsal lateral areas of the propodeum, covering the lateral angles and extending slightly into the concavity and over the ventral areas; tegulæ anteriorly, posteriorly and along the inner margin; apical margins of the first to fifth abdominal tergites, the fasciæ deeply emarginate on each side of the middle (on the fourth and fifth tergites the median portion is nearly as wide as the sides, but it is considerably narrower than the sides on the second and third, while the first is but narrowly margined with white in the middle and has the sides abruptly and very extensively white); a small spot in the hind angles of the third to fifth sternites; an elongate, narrow spot on the anterior (outer) face of the middle and hind coxæ; outer apices of all the femora; a stripe on the outer face in the basal half of the front tibiæ; and outer face of middle and hind tibiæ. The under side of the sixth to tenth antennal segments is more or less spotted with ferruginous to dirty white. Wings subhyaline, fairly uniformly tinged with amber-yellow, a little more smoky in the radial cell; veins ferruginous, the costa paler; stigma amber-yellow.

Male unknown.

Peru: Payta, August 28, one female collected by Professor

T. D. A. Cockerell. Holotype in the Museum of Comparative Zoölogy, at Cambridge.

Microtrimeria finds its nearest relatives in the Neotropical genus *Trimeria* and the South African *Masariella*. From *Trimeria* it differs in the presence of parapsidal furrows, the two apical spurs of the middle tibiæ, the rounded, not mucronate propodeum, and the absence of constriction at the base of the abdominal tergites. From *Masariella* it may be separated by the rounded, not mucronate nor angular propodeum, the uniformly fusiform flagellum (in the female of *Masariella* the apical segments are set off as a distinct club), the simple tarsal claws, and the venation (the medio-cubital cross-vein in *Masariella* ends opposite the submedian vein, or even a little apicad). According to Bradley (1922, Univ. California Publ., Ent., I, No. 9, p. 399), the parapsidal furrows are absent in *Masariella*, but I find them well developed in the genotype, *M. alfkeni* (du Buysson), as well as in two other species, *M. saussurei* (Brauns) and *M. spinolae* (H. de Saussure).

The only other Neotropical genus of Masaridinæ[1], *Ceramiopsis* Zavattari, agrees with *Microtrimeria* in the presence of parapsidal furrows, in the rounded lateral angles of the propodeum, and in the middle tibiæ bearing two apical spurs. It differs conspicuously in the shape of the abdomen (the first segment being narrowed at the base into a neck) and in the mouthparts (maxillary palpi of 6 segments; labial palpi of 4 segments).

I agree with Bradley in placing *Masaris saussurei* in *Masariella*. *Masaris spinolæ* (de Saussure), of which I have studied a male and a female, should likewise be transferred to that genus. In both these South African species the scutellum is strongly produced behind, completely hiding the postscutellum when viewed from above, the mesepisternum is completely divided by a suture into an upper and a lower plate (a character also present in *Masariella alfkeni*), and the parapsidal furrows are well developed. In *Masaris vespiformis*, on the other hand, the post-

[1]As I have shown in a recent paper (1928, Ann. Mag. Nat. Hist., (10) II, p. 143-145), the genus *Paramasaris* P. Cameron (Syn.: *Zethoides* P. Cameron, *Plesiozethus* P. Cameron, *Metazethoides* W. A. Schulz) should be removed from the Masaridinae and placed in the subfamily Gayellinae.

scutellum projects considerably behind the scutellum, the mesepisternum is not divided by a suture, and the parapsidal furrows are absent. Since, according to Brauns, *Masaris discrepans* Brauns is exceedingly close to *M. saussurei* Brauns, there can be little doubt that all South African species thus far placed in *Masaris* are more correctly placed in *Masariella*, as was suspected by Bradley.

Having had an opportunity to study the female of *Trimeria buyssoni* Brèthes, I may add a few notes on the generic characters in that sex. I suspect that some of the characters given for the male by Bradley (1922, Univ. California Publ., Ent., I, No. 9, p. 433) are of specific value only. In the female of *T. buyssoni*, the ocelli are placed in a flattened (not in an equilateral) triangle; the antenna consists of 12 segments, the flagellum being uniformly incrassate throughout, without apical club; the parapsidal furrows are absent; the anterior trochanter ends in an obtuse, narrow lobe, which, however, does not project beyond the lower margin of the femur; the anterior femur is swollen and flattened as in the male, but not angled at the base; the middle femur is flattened beneath; both the last tergite and sternite are obtusely pointed at apex, the sternite thickened along the margin and depressed on the disk. I find the larger posterior tibial spur trifid (not bifid as given by Bradley).

Trimeria buyssoni is the only species of *Trimeria* which I have been able to study. So far as one can judge from the rather incomplete published accounts, the genotype, *T. americana* (H. de Saussure), and the three other described species, *T. neotropica* (Mocsáry), *T. joergenseni* Schrottky, and *T. howardi* Bertoni, are congeneric with *T. buyssoni*. Of these five species only three appear to be distinct upon morphological characters, *viz.*, *T. americana*, *T. buyssoni*, and *T. neotropica*. It would seem that *T. joergenseni* is but a color variant of *T. buyssoni*, while there is nothing in the description of *T. howardi* (apart from differences in coloration) to allow of its separation from *T. neotropica*.

MERMIS PARASITISM IN *PACHYCONDYLA STRIATA*.

By T. D. Strelnikov
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In my collection of ants from Alto Parana (Paraguay) I encountered a large specimen of *Pachycondyla striata* F. Sm. which was infected with a nematode worm (Mermis). In a recent paper by Professor W. M. Wheeler[1] the whole problem of Mermis

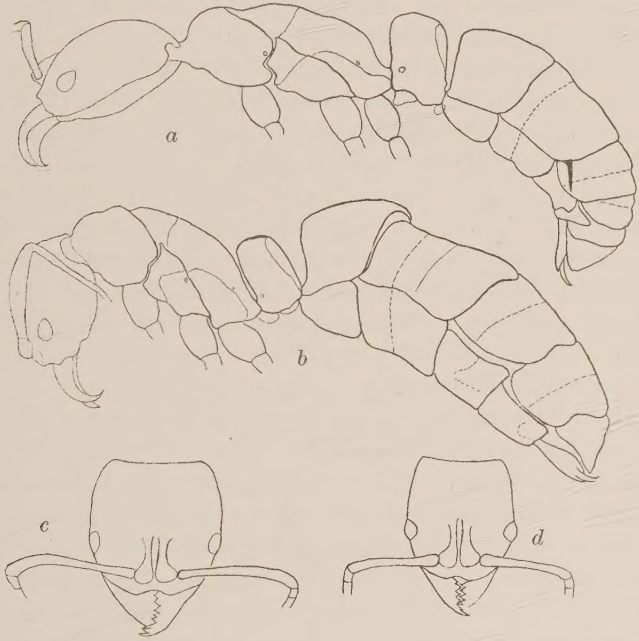

Fig. 1. a, *Pachycondyla striata*; normal; b, *Pachycondyla striata*; Mermithized; c, head of normal worker from above; d, head of Mermithergate.

parasitism and intercastes among ants is reviewed. He has given an account of all cases of mermithism, including several new cases among certain Neotropical Formicidæ. Professor Wheeler gives also an interpretation and a discussion of the whole problem of mermithized ants and a list of the relevant literature.

The *Pachycondyla striata* from Paraguay, which I have

[1]Wheeler, W. M. Mermis Parasitism and Intercastes among Ants. Journ. Exper. Zool. Vol. 50, No. 2, 1928.

studied in Professor Wheeler's laboratory at the Bussey Institution, represents a new case of mermithization, similar to that of *Pachycondyla fuscoatra*, described by Emery.

Pachycondyla striata was found in small colonies under dead leaves. It stings severely and when disturbed can bury itself quickly into the ground. I encountered the parasitized specimen of *Pachycondyla striata* running along a trail in the forest in the neighborhood of Puerto Bertoni, where the famous naturalist Dr. M. S. Bertoni lived. The movements of the ant were slow.

The differences presented by the morphology of the parasitized *Pachycondyla striata* in comparison with an unparasitized specimen may be seen from the accompanying figures.[2] The gaster of the mermithergate is very voluminous and swollen. In the normal ant the abdominal segments are fitted into one another so as to allow the abdomen to dilate as a whole. But in the parasitized individual some of the segments are more or less separated from one another, so that the abdomen is increased in length from 6.5 mm. in a normal to 8.5 mm. in the mermithergate individual and from 2.25 to 3 mm. in diameter. The petiole of the parasitized ant is narrower and lower, than in normal workers. Some modifications in the thorax were also observed. The pronotum of the mermithergate is shorter and the epinotum narrower than in normal *P. striata*.

The greatest difference is discernible in the head, which in the parasitized specimen is conspicuously smaller and less robust, i. e. narrower and shorter, and of a peculiar narrow, more rectangular shape behind the eyes. There are no traces of ocelli.

The mandibles of the infected specimen are narrower and smaller, the antennal scapes decidedly shorter and a little thinner. The funiculus is also slightly shorter.

The surface of the body is smoother and more shining than in normal *P. striata* workers, owing to the fewer hairs on all parts of the body. The color of the hairs is also different. In the parasitized specimen they are more grayish, but in normal *P. striata* they are golden-yellow.

In the intersexual form of *P. striata* we have parasitic castration and mingling of the normal secondary sexual characters.

[2]Made by camera lucida.

THE TARSAL CHEMICAL SENSE OF THE SCREW WORM FLY, *COCHLIOMYIA MACELLARIA* FAB.

By Cyril E. Abbott,
Elgin, Illinois.

In 1921 Minnich found that the tarsi of *Pyrameis atalanta* Linn. and of *Vanessa antiopa* Linn. are sensitive to certain soluble compounds. He (1922) further demonstrated that a variety of compounds, when applied to the tarsi, result in an extension of the proboscis. Under some conditions even distilled water gave this result. The threshold varies with the physiological state of the animal. In 1926 Minnich also published a paper demonstrating that *Phormia regina* Meigen, *P. terræ-novæ* R. D., and *Lucilia sericata* Meigen also have this tarsal sense. These flies distinguish between water, paraffin oil, and saccharose solution by means of the tarsi and the oral lobes of the probosces.

The chemical senses of the screw worm fly (*Cochliomyia macellaria* Fab.) have been much studied and discussed, but owing to the fact that this work has been concerned with purely practical results, it has not greatly clarified the problem. (See U. S. D. A. Bul. No. 1472). While working for the Bureau of Entomology during the summer of 1928, it occurred to me that in order to study properly the chemical senses of these insects, separation of contact and distance stimuli was necessary. The short time at my disposal was accordingly devoted to the demonstration and study of tarsal receptivity.

Newly emerged flies were constantly available, and these were generally used. As these young flies were very restless, it was often necessary to defer the tests to the day following emergence. In no case were flies over twenty-four hours of age used in the first series of tests. Each fly was put into a shell vial (2.5 x 10 cm.), the open end of which was then closed with a single layer of cheese cloth held in place by a rubber band. Each fly was tested by wetting the cloth with the test substance. Extension of the proboscis was recorded as a positive response; the converse was considered negative. Flies that extended the proboscis before stepping upon the cloth were marked positive to

water vapor, and those not so responding were considered negative. This served as a check on the contact responses of the insects. The contact water tests served as a check on the responses to sugar solution.

Flies received no water until the first test. For flies tested the day after emergence this time interval was twenty-four hours; otherwise it was about four hours after emergence. Experience soon developed the fact that flies kept for a few hours without water, almost without exception extended the proboscis as soon as their tarsi encountered moisture. Such flies were said to be *water sensitized*. The only difficulty encountered was the general restlessness of the insects; this made it necessary to extend the period of water inanition, in many cases, to the following day. The only effect this had was to quiet the flies. There was no essential difference in their responses, from those kept for shorter periods without water.

The same flies were then given an abundance of water and tested again, usually about half an hour later. Such flies did not usually respond by proboscis extension. They are hence described as *water non-sensitized*. None of these flies were given food until tested with sugar solution. They were tested immediately after becoming *water non-sensitized*, that is, immediately after the tests just described. This interval probably never exceeded thirty minutes. Flies that were *water non-sensitized* were therefore *sugar sensitized*. They responded to sugar solution but not to pure water. All flies were carried through the three tests.

All the water used in the tests was distilled. The sugar solution consisted of 10 gms. of sucrose in 100 c. c. of water. Tests were also made with a solution of urea (5 gms. in 100 c. c. of water). No preliminary tests were made for vapor reactions with urea, but the flies were all *water non-sensitized*. A nearly equal number of male and female flies were used. Hypersensitive specimens were discarded.

The following is a summary of the response data with water and with sugar solution:

	Vapor		Liquid	
Water sensitized	Positive	Negative	Positive	Negative
Number (of flies)	7	190	173	24
Percent	3.5	96.5	97.9	12.1
Water non-sensitized				
Number	10	198	32	176
Percent	4.8	95.2	10.5	98.5
Sugar sentized				
Number	7	209	198	18
Percent	3.2	96.8	91.7	8.3

All flies tested while *water sensitized* were used in the other tests. The experiments with urea gave the following results:

	Positive	Negative
Number	5	44
Percent	3.2	89.1

The fact that the sexes were almost equal in number, and that they responded equally, indicates that there can be no great difference between them as regards this sense. The data given indicates that water vapor was not an important factor in initiating responses. The feeding reactions of the flies depended upon physiological states; those kept from four to twenty-four hours without water gave more reponses than those which had taken in water within thirty minutes. A comparison of the contact responses demonstrates that the flies easily distinguish between pure water and the sucrose solution.

The results of the experiments with urea were unexpected. Not only did the specimens fail to give a feeding response; they apparently made violent efforts to escape continued contact with the solution. Urea is very bitter to human end organs, and it

may have a similar effect upon the tarsal organs of the flies. Flies are not attracted to a solution of pure urea.

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A NOTE ON THE GENUS PELECINUS.[1]

By Charles T. Brues.

The peculiar hymenopterous genus Pelecinus is represented in North America by *P. polyturator* Drury, which extends also into South America. Over the southern part of its range, this species varies greatly in color and a number of species have been described from tropical America which are perhaps only variations not worthy of specific rank.[2] Pelecinus is highly dimorphic and the sexes can be instantly recognized by the form of the abdomen. In the male, this part of the body is strongly clavate and less than twice as long as the remainder of the body, whereas in the female the abdomen is linear and fully five times as long as the head and thorax together. The female of this insect is a common North American insect, and has been bred from the larvæ of scarabæid beetles of the genus Phyllophaga (=*Lachnosterna*). The male on the other hand is very rarely seen and is always regarded by those familiar with the species as a very unusual find. Since the female is frequently seen in great numbers, there can be no question that the male is actually very scarce and that practically all the individuals of the species in the United States are females. It would seem therefore that these females must ordinarily reproduce parthenogenetically and that under such circumstances female progeny are produced; *i. e.*, that they represent a thelytokous race. On the other hand, among the neotropical color varieties males are well represented in the population for they are frequently obtained by collectors. This makes it probable that the economy of the tropical forms is widely different from that of the nearctic ones.

Ashmead[3] makes the statement that the female is not rare in some of our northern states during August and September

[1]Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 302.

[2]Cf. Roman, Ent. Tidskr., 1910, p. 196. I am inclined to believe, however, that there is more than one neotropical species since two males that I have seen show a great difference in the form of the first abdominal segment, exactly as figured by De Romand nearly a century ago. (Mag. Zool., 1842, pl. 86).

[3]Journ. New York Entom. Soc., vol. 10, p. 243, 1902.

(most of the specimens I have seen bear the date of August; a few July and September)where the female forms a conspicuous object when flying, since its flight is slow and difficult on account of its abnormally lengthened abdomen. He says further, "The male, on the contrary, is extremely rare and exceedingly rapid in flight. It is sharp-eyed, takes flight rapidly, and is rarely captured." I have never seen but one male alive, but it was captured without difficulty. One morning in mid-August 1900, I spied a male resting on the soil beneath an old apple tree on the grounds of the Marine Biological Laboratory at Woods Hole, Mass. It was in company with a considerable number of females and was still there when I returned after hastily securing an insect net from the near-by laboratory building. This male appeared to be in no way especially wary, and although he may have been freshly emerged, he was fully mature, with the body completely colored and hardened.[4]

Judging from the behavior of this individual and the frequency with which males are taken in Central and South America, it seems plausible to suppose that males of the northern race are not nearly so abundant and that this is a true spanandrous race. Probably, however, even in northern localities males at times occur in somewhat greater numbers.

The males are so notoriously uncommon and so prized by collectors that attempts have been made to attract them by enclosing a number of females in a gauze box exposed in a place where the species is abundant. I have been told by collectors in Chicago many years ago that this method is sometimes successful and that in certain localities a few males may be obtained in this way, just as males of certain moths may be trapped in great numbers by the same subterfuge. This may be due to the presence of males only in certain restricted places. At any rate the economy of this extremely aberrant and interesting group of Hymenoptera deserves further study, since it appears that in different parts of its geographical range, it very evidently reproduces in a different manner, the northern race represented

[4]Professor Nathan Banks confirms this observation as he tells me that a male specimen which he took at Falls Church, Va. was likewise not a very active insect.

almost entirely by thelytokous females and the tropical forms by a comparatively equal proportion of males and females.

The systematic position of Pelecinus has always been a matter of disagreement among hymenopterists. Ordinarily it has been regarded as a highly modified member of the superfamily Serphoidea (Proctotrypoidea), but recently Handlirsch has considered it to form a superfamily annectant between the Terebrantia and Aculeata. Considering its highly specialized form and isolated position it is impossible to determine the relationships of Pelecinus with any great degree of satisfaction. Some recent studies which I have made upon the fauna of the Baltic amber lead me to believe that the recent Pelecinus has been derived from a type represented by the very primitive Stephanidæ through types existent in the early Tertiary that I am inclined to believe show a derivation of Pelecinus from a Stephanid-like ancestor.

Such being the case we have in Pelecinus a primitive type which has become modified in certain regions to a thelytokous method of reproduction, such as is seen in certain very much less primitive parasitic Hymenoptera of the superfamily Ichneumonoidea. In most of these, arrhenotoky prevails although a few cases of thelytoky have been observed and frequently normal arrhenotoky with the occasional production of a very few females in the brood. Evidently the appearance of thelytoky in Pelecinus is definitely related to climate and may be regarded as a recent acquisition.

In 1894[5] Patton described a second North American species from Tennessee to which he gave the name of *P. brunneipes*. This he distinguishes from *P. polyturator* by its smaller size, lighter legs, the presence of an oblong brown cloud in the first cubital cell behind the stigmal cloud, the presence of punctoreticulate sculpture on the disc of the propodeum in place of the transversely arcuately rugose sculpture of *P. polyturator*. I have had in my collection for a number of years a very small female Pelecinus taken by Prof. W. M. Wheeler at Colebrook, Conn., in August 1910, which is probably the form described by Patton. It differs very markedly from all of the numerous females of *P.*

[5](Amer. Naturalist, vol. 28, p. 896).

polyturator with which I have compared it, but no further examples have come into my hands during the eighteen years that have elapsed since this one was obtained. There are however, in the collection of the Museum of Comparative Zoölogy four additional females, three from the Banks collection taken at Falls Church, Va., taken during August and September and one from Jones Creek, Lee Co., Virginia. From Patton's description, the Connecticut specimen differs slightly in having the white antennal annulus restricted almost entirely to the apex of the ninth segment, not extending over the tenth, and in having only a single cloud, mainly in the radial cell of the fore wing.

P. brunneipes can hardly be regarded as more than a distinct subspecies, but it is distinguishable very readily from the typical form. The following dichotomy indicates the structural differences between the females of the two.

Front coarsely reticulate medially, smooth at the sides, with some coarse punctures between the reticulate and smooth parts; parapsidal furrows coarsely crenulated or cross-striated; propodeum behind middle distinctly transversely rugose-reticulate, sometimes with large punctures intermixed; fore wing distinctly clouded only in the radial cell; length 50-60 mm.

P. polyturator Drury.

Front between the base of antennæ and the ocelli coarsely and quite regularly punctate, some of the punctures confluent; parapsidal furrows indicated by a line of fine, evenly spaced punctures; propodeum smooth, except for a few separate punctures medially behind the middle; fore wing sometimes (in the type) with a second apical cloud in the cubital area, below the cloud in the radial cell;[6] length 27-31 mm.

P. polyturator, subsp. *brunneipes* Patton.

The male of this form must be comparatively rare also as none has ever been recorded and there is no reason to suppose that it occurs any more abundantly than that of the larger North American form.

[6]A variety from Peru, *P. polyturator,* var. *apicalis* Roman has the apex of the fore wing broadly and distinctly blackened.

Although I have been pondering over the peculiar disparity in the sex ratio of Pelecinus for some years, it is only after having read Vandel's recent paper on geographical parthenogensis[7] that the significance of the matter seems clear. Vandel applies this term to a condition which he finds to exist in very diverse groups of invertebrates, where two races of a single species occur in different regions, the one reproducing bisexually and the other by a process of permanent parthenogenesis. Furthermore in the cases studied by Vandel, he found that the bisexual race is the one inhabiting the tropical part, or at least the warmer portion of the range of the species. There is also a further difference in the number of chromosomes whereby a condition of polyploidy is developed in the parthenogenetic form.

It is quite evident that the case of Pelecinus agrees exactly with Vandel's cases of geographical parthenogenesis. The tropical forms are bisexual, and quite generally smaller in size, while the northern one is highly spanandrous and the female is extremely large. The large size of the northern race is especially noteworthy as it is a very large insect, particularly the female which may quite probably be a tetraploid form, although this has not been determined cytologically.

Pelecinus is therefore most probably a further example of geographical parthenogenesis and extends the occurrence of the phenomenon to the parasitic Hymenoptera.

[7]La Parthonegenése géographique, Bull., Biol. France et Belgique, vol. 42, pp. 166-281; 1928.

A NEW GALL MITE ON *PRUNUS MARITIMA* WANG.[1]

By James Kendall.

The examination of a collection of the short stalked, red, pouch galls taken on *Prunus maritima* Wang. at Woods Hole showed that the mite producing it was not a variety of *Eriophyes padi* Nal. as it has previously been believed. It differs from *Eriophyes padi* Nal., the producer of a pouch gall on the leaves of *Prunus padus* L., in that it is larger, has a pair of accessory setæ, and has a greater number of striæ. Schoene (1907) cites the difference of *Eriophyes pruni* Schoene, the mite producing a pouch gall on *Prunus americana* L., from *Eriophyes padi* Nal., which it was supposed to have been, by the possession of a pair of accessory setæ. Unfortunately, Schoene has not published a description of the mite which he refers to his manuscript of 1907. The mite which occurs on *Prunus maritima* may be a closely related form of the mite which Schoene refers to under the name of *Eriophyes pruni* Schoene. Until extensive collections of the genus *Eriophyes* occuring in America are made and preserved with some degree of permanence, it is necessary to consider many forms as distinct species which may later be considered subspecies and varieties of a certain designated type species. Such a process must occur slowly, even as it has in Europe under the guidance of Dr. Alfred Nalepa. The description of the mite producing the gall on *Prunus maritima* Wang. will be given under the name of *Eriophyes maritima* and considered as a new species. (fig. 1.)

Eriohpyes maritima n. sp.

Body cylindrical; thoracic shield with median longitudinal ridges on the dorsum and does not project over the rostrum, which is relatively very short and curves slightly downward. Tubercles of dorsal setæ near posterior border of shield and farther apart than the length of the setæ which incline toward each

[1]Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 306.

other across the median line of the shield. Legs long and slender; tarsus and tibia of equal length; feathered claw four-rayed and in the second pair of legs exceeded in length by the claw bristle. Sternum bifurcate with thoracic setæ II very near its outcurving ridges; thoracic setæ I, the shortest of the thoracic setæ, is well forward and anterior to the plane of the anterior end of the sternum; thoracic setæ III is the longest of the thoracic setæ and arises from large tubercles at the base of the coxæ of the second pair of legs. Abdominal striæ 65-75 in number with fine tuberculation often limited to the ventrum; last 5 striæ near

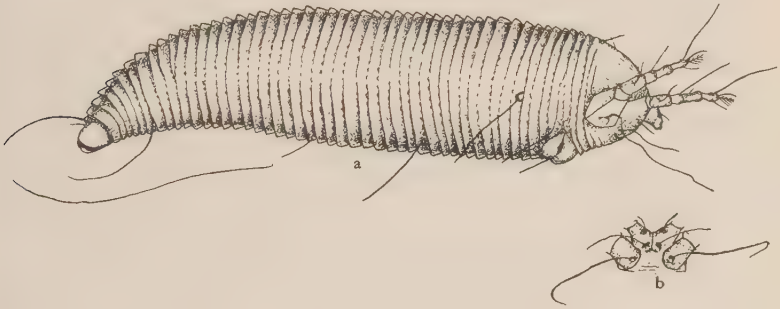

Fig. 1. *Eriophyes maritima* n. sp. on *Prunus maritima*: a, lateral view; b, ventral view of thorax.

the telson without tubercles but with ventral longitudinal striations. Lateral setæ posterior to the plane of the epigynium and the same length as ventral setæ I; ventral setæ II, the shortest and most median of the ventral setæ, as long as the dorsal setæ; ventral setæ III the longest and stoutest of the ventral setæ; the genital setæ about twice as long as the second pair of thoracic setæ; caudal setæ almost half the length of the body; accessory setæ acicular and not half as long as ventral setæ II. Female, 280x 70μ. Described from specimens killed and mounted in aceto-carmine; slides also prepared with celloidin method given by Ahmed Hassan (1928), from material collected at Woods Hole, July 2, 1928.

Measurements of the bristles and setæ of *Eriophyes maritima*: Feathered claw 9μ, claw bristle 1 9μ, 2 10μ, outer setæ of

leg 1 30μ, femoral setæ 10μ, patellar setæ 10μ, thoracic setæ 1 10μ, 21 30μ, 111 65μ, lateral setae 30μ, dorsal setæ 16μ, ventral setæ 1 35μ, 11 16μ, 111 40μ, caudal setæ 130μ, accessory setæ 7μ.

The gall which Eriophyes produces on *Prunus maritima* Wang. is probably the one which Chadwick (1907) lists in his catalogue as No. 97 for that plant host and considers it to be the same as his No. 100 which occurs on the leaves of *Prunus serotina* Ehrh. However, fresh material and sections of the galls show them to be quite distinctly different from each other. The gall on *Prunus maritima* is dull red, has a shorter stalk, has a rough surface with coarse trichomes, and has a corrugated inner wall with trichomes present only in the oriface which opens to the under side of the leaf. The gall on the leaves of *Prunus serotinæ* Ehrh. (*Padus virginiana* L. Mill.) is green or rose colored, smooth surfaced, has a longer stalk, and has on the inner walls cellular, trichome-like outgrowths, besides the trichomes which fill the oriface. The mites in these latter galls lack the accessory setæ and may be a subspecies of *Eriophyes padi* Nal., or a variety as Prof. Parrott (quoted by Chadwick 1907) believed them to be.

NEW ORIBATOID MITES

By Arthur Paul Jacot.

Shantung Christian University.

In working over various collections and a revision of the Phthiracaridæ of the northeastern states, the following forms were found to be undescribed:

I. From the Territory of Hawaii:

Indotritia subgen. nov. (**Euphthiracarus**)

Related to genera Tritia, Euphthiracarus, Acrotritia, Oribotritia, but with bristles of aspis very short, the posterior ones closer to each other than to pseudostigmata and between them, median bristles near edge of aspis and close to pseudostigmata, lateral carina usually well developed; abdomen usually rounded (barely pointed) behind; anal plates with long median blades, usually with bristle at their base; lateral plates with at least two pairs of anterior bristles and three pairs of posterior bristles.

Type:—*Tritia krakatauensis* Sellnick (Treubia, vol. 5 (1924), pp. 372-373, figs. 1-3).

E. (Indotritia) bryani sp. n.

Aspis from side with postero-median depression, lateral carina not strongly developed; pseudostigmatic organ rather short, blade-like; abdomen similar to that of type, bristles short; venter rather broad, lateral plates with two pairs of anterior bristles and three pairs of posterior bristles, anal plates with basal bristles only.

Type locality:—"Wilkes Id.," Wake Island, under stones; Aug. 2, 1923; coll. by E. H. Bryan, (Tanager Expedition), about 24 adults, no. BBM07T1 and BBM07T2. *Cotypes* in Bernice Bishop Museum, Honolulu and Museum of Comparative Zoölogy respectively.

E. (Indotritia) hawaiiensis sp. n.

Aspis with median carina, lateral carina distinct; pseudostigmatic organ very short and fine; abdomen similar to that of *T. javensis* Sellnick (1925), bristles rather long and stout; lateral plates with two pairs of anterior bristles, anal plates with two pairs of bristles.

Type locality:—Kaala Mts., Oahu; April 1892; coll. by R. C. L. Perkins, 5 adults, no. BBM18P *Colypes* in Bernice Bishop Museum.

Galumna swezeyi sp. n.

Large (.75 x .95 mm.) lamellæ thick; rostral bristles close to edge of lamellæ, long, faintly barbed on outer edge; lamellar bristles very much included, long, tips almost meeting, strongly barbed; interlamellar bristles long, stout; pseudostigmatic organs short, with oval to obovate head; pteromorphal groove partially filled by an area porosa; areæ porosæ mesonoticæ large, round-oval, far down on sides; median pore large; paramesial bristles midway between apertures. Color amber yellow.

Type locality:—Kuliouou, Oahu; March 5, 1920; coll. by O H. Swezey, 2 specimens, nos. SPES1181 and SPES1182. *Cotypes* at Sugar Planters' Experiment Station, Honolulu and Museum of Comparative Zoölogy.

II. From the States of Connecticut and New York.

Phthiracarus olivaceus sp. n.

Size fairly large (abdomen .42 x .63 mm.); aspis anteriorly depressed, posteriorly flattened, median bristles between pseudostigmata, posterior bristles inserted beneath abdomen rim; pseudostigmatic organ rod-like, distal end resembling flower stigma, only slightly dilated; abdomen somewhat long-oval, broadest behind center, posteriorly depressed, bristles heavy, of same caliber throughout, six pairs in median row; ventral bristles at suture, the posterior pair remote from each other; anal plates nearly as wide as genital, anterior lapets well developed, bristles: two marginal, three "median"; genital plates dove-tailing at posterior end, bristles; one anterior marginal, four median; color olivaceous, texture sanded.

Type locality:—orchard, one mile west of East Village, Monroe, Conn.; lower face of old rail, soft moist spot; Aug. 22, 1927; coll. by the writer, 33 specimens, no. 2527h2. *Cotypes*:—M. C. Z.

Phthiracarus setosellus sp. n.

Size somewhat small (.34 x .54 mm.); aspis anteriorly depressed, posteriorly flattened, posterior bristles near median; pseudostigmatic organ short, scalpel—or lancet-like; abdomen rather elongate, oval, widest at center, bristles long, tapering, fine, five pairs in median row; ventral bristles at suture, the posterior pair remote from each other; anal plates as wide as as posterior end of genital plates, median bristles more lateral than in preceding; genital plate bristles: two marginal, five median, the posterior-most marginal; color pale tan; texture sanded.

Type locality:—Glen Cove, Long Is., N. Y.; from rotten wood and under bark slabs; May 8, 1920; coll. by writer, 5 specimens, no. 209h. *Cotypes*:—M. C. Z.

III. From Switzerland.

Achipteria oudemansi sp. n.

Size rather large; .34 x .64 mm., thus extremely slender; lamellæ with inner distal angle more anterior than outer, as seen from above elongate ovate i. e. anterior half wider than posterior half; base of lamellar bristles close to end of lamellæ; notogaster extremely pinched together between lamellæ forming an acute angle and extending far in between them; interlamellar bristles opposite end of notogaster and inserted on the lamellæ; pseudostigmatic organ long, slenderly clavate, extending far beyond sides of pteromorphæ which are drawn out into long, slender horns, their ends turned inward almost touching the lamellae; anterior end of camerostome pointed or carinate; anterior ventral angle of pteromorphæ drawn out into a sharp corner; anal covers the diameter of one of them distant from posterior edge of ventral plate.

Type locality:—Les Rasses, St. Croix, Vaud: moss, near a wall; Aug. 10, 1927; coll. by Mr. Auguste D. Jacot, 6 specimens, no. 270301c. *Cotypes* in the writer's collection.

A NEW CECIDOMYIID OF THE GENUS LESTODIPLOSIS.

By Charles W. Johnson,
Boston Society of Natural History.

The following species was received from Mr. R. L. Taylor, who, in making a biological study of the White-pine weevil (*Pissodes strobi* Peck.), has secured many interesting species of insects that are either parasitic, predaceous, commensal or otherwise. The larvæ of the genus Lestodiplosis according to Kieffer are zoöphagous, subsisting upon the larvæ of Cecidomyiids, Mycetophilids, and Xylophagids. Dr. E. P. Felt says[1]:—"This record of zoöphagous habits is confirmed by the rearing of American species, since members of this genus were obtained from a wide variety of galls and the larvæ evidently subsisted upon Itonidids, other small insects and acarids."

Lestodiplosis iridipennis sp. n.

Head black, antennæ white, joints of uniform length, the enlarged portions narrowly banded with black. Thorax yellowish, when viewed from the front showing three broad brown stripes extending to the base of the wings, scutellum yellow, metanotum black, abdomen yellow with yellow hairs. Legs white, tibiæ with the base, middle and tip banded with black, tarsi with the base and tip of the first and second joints black. The base of the third joint is also narrowly black. Wings with yellow and blackish hairs, the latter arranged in spots, these hairs are highly iridescent when viewed at certain angles in a bright light, giving the wing a golden yellow color, ornamented by six large, bright, purple spots, regularly placed, the two anterior ones between the costa and radius, two in the middle of the wing, and the two posterior ones extending on both sides of the cubitus, the outer end of the cubitus is also slightly purplish. Length 1.5 mm.

One male, July 10, 1928, from material taken at Oneonta, N. Y. Type in the Museum of Comparative Zoölogy.

This beautiful little midge is so pronounced that I trust the above description will suffice. It would run to *L. florida* in the table by Felt, but the antennæ do not agree. In the description of *L. florida* the color of the thorax and wings are very different.

[1]New York State Museum Bull., Nos. 231-232, p. 129, 1921.

THE ARTHROPOD FAUNA OF CONIFEROUS LEADERS WEEVILED BY *PISSODES STROBI* (PECK).[1]

By Raymond L. Taylor.

An interesting feature of a study of the bionomics of the white pine weevil, *Pissodes strobi* (Peck), is the varied fauna found associated with it under the same general ecological conditions. Many of these forms bear the very definite relationship of parasite and host or predator and prey, but there remains a number of coexistent species which show no obvious connection with the weevil. This paper deals with the latter group.

In the course of dissecting a large number of the weeviled terminal shoots of the white pine, *Pinus strobus*, Scotch pine, *P. sylvestris*, and Norway spruce, *Picea excelsa*, but principally while breeding out parasitic forms, an incidental series of 90 spiders, mites and insects was obtained. The majority of the miscellany treated herein represent the captures on or near a scrim screen in the window of a room in which 2602 leaders weeviled the previous summer were confined. The primary purpose of this breeding room was to obtain a large number of the insect parasites of Pissodes with a minimum of labor and breeding apparatus. Most of the fauna from this room were taken under conditions which, perhaps, do not establish conclusively that they were from the shoots, but it may be said that the breeding room was empty, except for the shoots, and all doors and cracks were sealed with gummed paper strips. It was, in general, made tight to prevent the escape of the desired parasites. It would seem, at least where species were numerous, that origin in the leaders is indicated. Fauna obtained from smaller cages, with no possibility of other origin, are noted as from localities other than Massachusetts.

This list is presented for what value and interest it may be worth. All specific determinations were made by specialists in the various groups. The following key will show by whom the determination was made, the abbreviation being enclosed in brackets in each case after the specific name.

[1]Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 301.

A—J. M. Aldrich
Bl—M. W. Blackman
Bu—August Busck
C—E. A. Chapin
Em—J. H. Emerton
Ew—H. E. Ewing
F—C. A. Frost
H—Carl Heinrich
J—C. W. Johnson
R—S. A. Rohwer
S—Grace Sandhouse

Grateful acknowledgement is hereby made to these authorities for their kindness, and to Mr. H. J. MacAloney and Dr. T. C. Barnes for permission to incorporate a part of their unpublished lists of incidental fauna from the same type of material, twelve and two species respectively. Species bred out by these investigators will be so noted. All localities, if not otherwise stated, are Boston, Mass. and environs.

It should be made clear that the following several classes are definitely *excluded* from this list:

1. All parasitic Hymenoptera, whether parasites of *Pissodes strobi* or otherwise.

2. Several predacious Clerids, one fly definitely known to be connected with the white pine weevil, one fly erroneously connected with the weevil in the literature, and one lepidopteron which is facultatively predacious upon Pissodes. These two classes are reserved for another and more extended paper.

3. All insects known to work in these leaders but not obtained, *e. g.*, the pine tip moth, *Rhycionia frustrana*, the pine-bark aphid, *Adelges pinicorticis*, *A. pinifoliæ*, *Pissodes affinis*, *P. approximatus*, *Hylobius pales*, *et al.* The white pine weevil, itself, was not obtained from the breeding room or the cages, although rarely, living adults may emerge after hibernation in the pupal cell.

It is realized that this miscellany is not a complete list of the arthropods associated with weeviled leaders, but it is believed that it comprises a fair representation of those forms which more or less regularly live or hibernate in such shoots.

Class Arachnida

In the opinion of Mr. J. H. Emerton, all of the following spiders, except *Agelena navia*, were very probably from no source

other than the leaders. There can be no question in the case of *Theridion murarium*, as it has often been dissected out of the leaders in the fall. Mr. Emerton states that no place of hibernation for this species has been reported previously. The indications are that this spider invades empty weevil pupal cells in the fall for shelter only.

Order Araneae

Family *Dictynidæ*

Dictyna muraria Em. [Em.] Late March, April. A few half-grown.

Family *Theridiidæ*

Theridion frondeum Htz. [Em.] April. 2 young.

T. murarium Em. [Em.] April. Abundant, all half-grown.

Family *Linyphiidæ*

Tmeticus bostoniensis Em. [Em.] April. 1 female adult.

Family *Argiopidæ* (*Epeiridæ*)

Epeira displicata Htz. [Em.] April. Common, all young.

E. patigiata Em. [Em.] May. Several, all young.

Family *Thomisidæ*

Philodromus sp. [Em.] April. 1 young.

P. sp. [Em.] April. 2 young.

Family *Clubionidæ*

Clubiona abboti L. Koch. [Em.] April. 1 female adult.

Family *Agelenidæ*

Agelena nævia Walck. [Em.] April. 1 very young.

Family *Salticidæ*

Mœvia vittata Htz. [Em.] May. 1 very young.

Tutelina (*Icius*) *elegans* Htz. [Em.] May. 1 very young.

Wala mitrata Htz. [Em.] April. 1 very young.

W. palmarum Htz. [Em.] April. 1 very young.

Order Acarina

Family *Tarsonemidæ*

Pediculoides ventricosus Newport. In frass under bark, spring and fall. Rare to abundant. Predacious on variety of larvæ in shoot; of no particular effect on *Pissodes strobi*, but highly destructive to insect cultures reared in the laboratory.

Family *Tyroglyphidæ* [Ew.]

Migratory, non-parasitic nymphs, or hypopi, of this family very common in frass and on a wide variety of insects. Particularly abundant in material from Ohio and New Hampshire. June, July.

CLASS INSÈCTA

Order Corrodentia

Family *Psocidæ*

Psocus sp. [J.] July. 19.

Order Hemiptera

Family *Miridæ*

Deræcoris pœcilus McAtee. [J.] May. 2.

Phytocoris eximius Reut. [J.] June. 1. Also Sizerville, Pa. July. 1.

Order Homoptera

Family *Chermidæ*

Psylla sp. [J.] May. 2.

Order Coleoptera

Mr. C. A. Frost has stated that it is remarkable that so many of the species listed below are "scavengers or inclined that way." He adds that he believes it very likely that (of the earlier forms) *Attagenus*, which was abundant, *Laricobius*, a rare form, possibly *Cryptophagus*, and *Glischrochilus*, regularly hibernate in white pine shoots. The occurrence of *Ptinus fur*, however, he considers unusual and yet it occurred in significant numbers. The striking abundance of *Galerucella luteola*, the elm leaf beetle, seems worthy of note.

Family *Carabidæ*

Stenolophus conjunctus (Say). [F.] Early May. 1.

Family *Histeridæ*

Carcinops quatuordecimstriata Steph. [F.] May. 1.

Family *Cleridæ*

Thanasimus dubius (Fab.). [F.] Sept. 1.

Hydnocera unifasciata Say. [C.] June, July. 12.

Phyllobœnus dislocatus Say. [C.] June, July. 18.

Three species omitted.

Family *Dermestidæ*

Attagenus pellio Linn. [F.] May. 26.

Trogoderma ornata Say. [C.] June. 1.

Anthrenus scrophulariæ (Linn.). [F. & C.] The carpet beetle May, June. 3.

A. verbasci (Linn.) [C.] July. 1.

Family *Ostomidæ*

Tenebroides corticalis (Melsh.). [F.] Late May. 1.

Family *Nitidulidæ*

Glischrochilus fasciatus (Oliv.). [F.] April. 1.

Family *Derodontidæ*

Laribobius erichsoni Rosenh. [F.] April. 1.

Family *Cryptophagidæ*

Cryptophilus integer (Heer.) [F.] Readfield, Me. Sept. 1.

Cryptophagus acutangulus Gyll. [F.] May. 4. Also Durham, N. H., Roscommon, Mich.

C. sp. [F.] Late May. 1.

Atomaria sp. [F.] Concord, N. H. Early June. 1.

Family *Coccinellidæ*

Scymnus punctatus Melsh. [F.] Late May. 1.

Family *Alleculidæ*

Hymenorus sp. [C.] July. 1.

Family *Tenebrionidæ*

Tenebrio obscurus Fab. [C.] July. 1.

Family *Melandryidæ*

Canifa pallipes (Melsh.) [F.] Late May. 3.

Family *Ptinidæ*

Ptinus fur Linn. [F. & C.] April to June. 18.

Family *Anobiidæ*

Sitodrepa panicea (Linn.). [C.] The drug-store beetle. July. 1.

Cœlostethus notatus (Say). [F.] April, May. 3.

Family *Scarabeidæ*

Trox scaber (Linn.). [C.] July. 1.

Phyllophaga fusca (Froelich). [F.] May. 1.

Family *Cerambycidæ*

Pogonocherus tomentosus Hald. [F.] Readfield, Me. Sept. 1.

Family *Chrysomelidæ*

Galerucella luteola Mull. (*xanthomelæna* Schrank). [F.] The elm-leaf beetle. May, early June. 165.

Family *Curculionidæ*

Magdalis perforata Horn. [F.] Mont Alto, Pa. June. 1.

Family *Scolytidæ*

Pityophthorus cariniceps Lec. [Bl.] May. 1.

P. puberulus Lec. [Swaine.] Bred by Barnes. N. Y.

Order Lepidoptera

Family *Tineidæ*

Tinea sp. [Bu] June. 1. Not a pine feeder.

Family *Tischeridæ*

Tischeria sp. [Bu.] June. 1. Not a pine feeder.

Family *Lyonetiidæ*

Bucculatrix sp. [Bu.] June. 1. Not a pine species.

Family *Gracelariidæ*

Lithocolletis ostensackenella Fitch. [Bu.] June. 1. Feeds on *Robinia*.

Family *Heliozelidæ*

Agonopteryx (*Depressaria*) *atrodorsella* Clem. [J.] April. Common.

Family *Gelechiidæ*

Eucordylea atrupictella Dietz. [Bu.] Bred by MacAloney, Petersham, Mass.

Paralechia pinifoliella Kearf. [Bu.] June. 1. The pine-leaf miner.

Recurvaria piceaella Kearf. [Bu.] June. 1.

Family *Tortricidæ*

Laspeyresia youngana Kearf. [H.] June. 7.

Taniva albolineana Kearf. (var. of *Peronea hastiana* Linn.?) [H.] June. 1.

Family *Pyralidæ*

Canarsia ulmiarrosorella Clem. [H.] June. 3. Not a pine insect; feeds on elm.

Dioryctria abietella Fab. [A.] Bred by MacAloney, Petersham, Mass.

One species omitted.

Order Diptera

Family *Trichoceridæ*

Trichocera brumalis Fitch. [J.] April. 1.

Family *Chironomidæ*

Forcipomyia specularis Coq. [A.] Bred by MacAloney, Petersham, Mass.

Family *Cecidomyiidæ*

Lestodiplosis iridipennis Johnson. [J.] Oneonta, N.Y. June. 2.

Family *Sciaridæ*

Sciara sp. [J.] May. Abundant. Also Oneonta, N. Y., Ansonia, Pa., Sizerville, Pa., Milroy, Pa., Durham, N. H. and Roscommon, Mich.

Family *Scutopsidæ*

Reichertella femoralis (Mg.). [J.] May, June. Common. Also Oneonta, N. Y., McConnellsburg, Pa., Sizerville, Pa., Milroy, Pa., Fayetteville, Pa., Concord, N. H.

Family *Scenopinidæ*

Scenopinus fenestralis Linn. [J. & A.] June, July. 4.

S. glabrifrons Mg. [J.] Late June. 1.

Family *Dolichopodidæ*

Medeterus sp. [J.] June. 1.

Family *Empididæ*

Tachydromia sp. Bred by MacAloney, Petersham, Mass.

Family *Phoridæ*

Megaselida (*Aphiochæta*) *rufipes* Mg. [J.] May. 3.

Family *Tachinidæ*

Chætotachina simulans Mg. [J.] June. 1. Mr. C. W. Johnson believes this form to be parasitic upon sawflies, of which a number invade the pupal cells of Pissodes to hibernate.

One species omitted.

Family *Calliphoridæ*

Calliphora erythrocephala Mg. [J.] May. 1.

Family *Muscidæ*

Muscina stabulans Fall. [A.] The common stable fly. Bred by MacAloney, Petersham, Mass.

Family *Borboridæ*

Leptocera sp. [A.] Bred by MacAloney, Petersham, Mass.

Family *Sapromyzidæ*

Sapromyza rotundicornis Lw. [A.] Durham, N. H. June. 2.

Family *Lonchaeidæ*

One species omitted.

Family *Chloropidæ*

Gaurax apicalis Mall. [Malloch.] Bred by MacAloney, Petersham, Mass.

G. festiva Lw. [J.] Oneonta, N. Y. July. 2.

G. sp. [J.] May. 1.

Hippelates sp. Bred by MacAloney, Petersham, Mass.

Madiza glabra [A.] Bred by MacAloney, Petersham, Mass.

Botanobia (*Oscinella*) *coxendi* Fitch. [A.] Bred by MacAloney, Petersham, Mass.

B. frit Linn. [J.] Late May. 9. Also Concord, N. H., Mont Alto, Pa., Northwestern Ct., and Oneonta, N. Y.

Family *Drosophilidæ*

Chymomyza amœna Lw. [A.] Bred by MacAloney, Petersham, Mass.

Drosophila funebris Fab. [J.] May. 6.

Scaptomyza graminum Fall. [A.] Ann Arbor, Mich. June, July. 27.

Family *Milichiidæ*

Desmometopa latipes Mg. [A.] July. 1.

Family *Ochthiphilidæ*

Leucopis simplex Lw. [J.] Common. Also China, Me., McConnellsburg, Pa.

Order Hymenoptera

Family *Tenthredinidæ*

Dr. Rohwer has written in reference to the following sawflies: "Not any of these species feed on pines. They feed in the larval stage on herbaceous shrubs, and were using the burrows of Pissodes only as places to hibernate."

Ametastegia glabrata (Fall.). [R.] Late May. 1 male.

Emphytus mellipes Nort. [R.] May, early June. 6 males, 4 females.

Emphytina aperta (Nort.). [R.] Readfield, Me. June. 1 male; Concord, N. H. Early June 1 male.

E. tener (Fall.). [R.] May. 2 males, 3 females; Fayetteville, Pa. Late May, 1 female; Ansonia, Pa. May. 1 female.

Hemitaxonus dubitatus (Nort.). [R.] Late May. 1 male.

Strongylogaster soriculatipes Cress. [R.] June. 1 female.

Pontania sp. [R.] June. 1 female.

The parasitic families *Braconidæ, Ichneumonidæ, Ceraphronidæ, Diapriidæ, Cynipidæ, Chalcididæ, Eurytomidæ, Eupelmidæ, Pteromalidæ* and *Eulophidæ*, of which a number of species were obtained, are omitted.

Family *Vespidæ*

Ancistrocerus tigris (Suass.). [J.] June. 1.

Family *Sphecidæ*

Trypoxylon frigidum Sm. [R.] Bred by Barnes. N. Y.

Stigmus fraternus Say (?) [S.] June. 1.

Pemphredon (*Diphlebus*) sp. [S.] June 5. Also Sidney and Readfield, Me. July.

Passalæcus annulatus Say (?) [S.] June. 1.

P. sp. [S.] June. 1.

Xylocelia sp. [S.] June. 1.

Family *Hylaeidæ*

Hylaeus sp. Bred by MacAloney, Petersham, Mass.

NOTES ON SOME BUTTERFLIES FROM NEW ENGLAND.

By Austin H. Clark,
Smithsonian Institution, Washington, D. C.

The following notes on butterflies taken in New England are worthy of record.

Eurymus eurytheme form **eriphyle** (Edwards)

In 1925 (Psyche, vol. 32, No. 6, December 1925, p. 297)I recorded as an unusually pale male of *Eurymus philodice* a specimen captured by Hugh U. Clark at Essex, Mass., on August 30, 1925.

On reëxamining this specimen I detected an almost imperceptible flush of orange on the lower half of the fore wings. The costal border of the fore wings is brighter yellow than the rest of the wings, and the inner border has a conspicuous rounded angle near the body.

There can be no doubt but that this is in reality an example of the form *eriphyle* of *Eurymus eurytheme*, the occurrence of which in Massachusetts I did not at the time suspect. The bright orange form of that species was noted at the same place on the same day, and a few days previously five of these were seen at Ipswich, not far distant.

Eurymus eurytheme form **ariadne** (Edwards)

Mr. Scudder recorded (Butterflies of New England, vol. 2, 1889, p. 1114, second aberration) a male of *Eurymus philodice* taken November 10 at Bangor, Maine, by Mr. Carl Braun in which all the wings, especially on the disc of the upper surface, were "shot with orange; the orange, though deep in color, is not of a solid character, but is more or less intermingled with yellow scales, giving a somewhat pink appearance."

This would appear to have been an example of *Eurymus eurytheme* form *ariadne*. About Washington this form is most

numerous at the end of the season, and has been noticed as late as November 11.

Eurymus eurytheme form **keewaydin** (Edwards)

Of the three males from Ipswich, Mass., taken on August 25, 1925 (Psyche, vol. 32, No. 6, December 1925, p. 297), one approaches closely the light form *keewaydin* to which, I believe, it should be referred. A second is intermediate, and the third, which is the largest, is of the form *amphidusa*. All three in life had slight violet reflections.

About Washington the form *keewaydin* is most common in late summer.

Dryas aphrodite cypris (Edwards)

Seven males and two females referable to this form were taken at Essex, Mass., all after the middle of July, 1925. They are at once distinguishable from the common form of *aphrodite* occurring in the region by the longer and narrower fore wings of which the outer border is distinctly concave, and by the less rounded and shorter hind wings. The ground color of the upper surface of the wings is light and almost uniform, and the black markings are reduced.

The two females have the wings more nearly of the normal type than the males. In both the black bar between veins M1 and M2 is extended inward so as to form a conspicuous black patch.

Careful comparison with a series of *cypris* from Colorado removes all doubt regarding the identity of these specimens.

Probably they do not represent an isolated colony of this western form, but instead should be interpreted as examples of a well characterized variant (a light long-winged "dry" form) which in portions of the west becomes the sole representative of the species.

Yet the occurrence in the same year in the same region of *Eurymus eurytheme* in the northern "dry" (*eriphyle*), intermediate (*keewaydin*) and "wet" (*amphidusa*) forms should be borne in mind.

Dryas aphrodite carpenterii (Edwards)

At Essex, Mass., late in the season there appears a small, dark and richly colored form of *Dryas cybele* with curiously short wings which appears to be identical with Edwards' *Argynnis carpenterii*.

Note.—The specimens herein recorded as the forms *eriphyle, keewaydin* and *amphidusa* of *Eurymus eurytheme* have been sent to the Museum of the Boston Society of Natural History; specimens of *Dryas aphrodite cypris* and of *Dryas cybele carpenterii* taken at Essex on July 18, 1925, are in the National Museum at Washington.

THE EFFECT OF THE EXTREME TEMPERATURE OF DEC. 7, 8, AND 9, 1927 ON HIBERNATING *CRIOCERIS ASPARAGI* L. AND *HIPPODAMIA CONVERGENS* GUER. AT AMES, IOWA

By Randall Latta
Ames, Iowa

During the early winter of 1927 at Ames, Iowa, the temperature dropped suddenly on Dec. 6 from 26°F to7° the following day, to —25° on the 8th and then rose again to —8° on the 9th. A small amount of snow had previously fallen, but was mostly in drifts, leaving many places exposed.

Field observations following this period proved that *Hippodamia convergens* Guer., a common coccinellid and *Crioceris asparagi* L. the asparagus beetle, were not able to withstand this unusual temperature.

Hippodamia convergens is probably the most common coccinellid in the vicinity of Ames, Iowa. Large numbers of them, as well as lesser quantities of other species of ladybirds, gathered in late summer at a turnip patch on a truck farm at the outskirts of Ames, to feed on the aphids there. As fall advanced the beetles hibernated in the sod fencerow at the edge of the turnip field.

In the latter part of December the above mentioned fencerow was examined and a 100% mortality found. In a space 6 feet long and one foot wide immediately bordering the turnip patch 26 dead *H. convergens* were counted. An open crevice of a fencepost held 50 dead ladybirds of this species, and between 50 and 75 dead specimens were removed from beneath a stone at the same place. At the same time living specimens of *H. parenthesis*, *H.* 13-*punctata* and *Coccinella* 9-*notata* were found active among the dead *H. convergens*.

Other observations made later supported the above findings. At a highland prairie northwest of Gilbert, Iowa, nearly 40 dead *H. convergens* were uncovered beneath stones, and at the time living *H.* 13-*punctata* and *H. parenthesis* were collected.

In the spring of 1928, *Hippodamia* 13-*punctata* and *H. pa-*

renthesis were very common while *H. convergens* were scarce enough to be almost rare.

At the same truck farm, a large asparagus bed was heavily invested with *Crioceris asparagi*. These beetles hibernated early in such shelter as they could find: in the sod of the fencerows, hollow asparagus stalks thruout the bed, hollow weed stalks, in the burrows of the grape cane borer, smartweed borer, and even in company with a strawberry leaf roller larva in a folded strawberry leaf.

After Dec. 10th an exhaustive survey of the asparagus bed revealed an almost total mortality, only six beetles being revived when warmed out of several hundred collected. The six were hibernating in a hollow asparagus stalk.

In the sod fencerow the beetles had hidden in the layers of decayed organic material found at the surface of the ground in most blue grass sod, but were never found in the ground. The first 12 or 14 inches of sod next to the asparagus sheltered the majority of the beetles that had thus wintered. As high as 83 specimens were counted in an area one foot square.

The asparagus beetles had not been observed to bore into a stalk, nor had any evidences of frass been seen in the stalks examined. Beetles had entered, usually, by the path of some previous insect, or at a broken internode.

A number of stalks in lots of 50 were examined to determine the number of beetles that had used such shelter, and in four lots the infestation ran 32%, 32%, 22%, and 52% with as high as 46 specimens in a single stalk.

Two species of *Anthicidæ*, *Anthicus cervinus* Laf. and *A. amœnus* Casey, were often collected in company with the asparagus beetles and always showed activity upon being disturbed.

Sanderson (Journal of Economic Entomology, Vol. I, 1908, pp. 245-262) plots on a map of the United States a series of isotherms showing the average annual-minimum temperatures and the relation between the northward limitation of certain forms and these isotherms. The average annual-minimum for central Iowa is —10°. The —25° of the past winter is therefore an exceptional drop for this locality.

The average annual minimum isotherm of —10° bisects Iowa, crosses northern Illinois, cuts thru Michigan and includes the region of Ontario influenced by the lakes, cuts thru New York state and the center of New England. Allowing for seasonal deviations of warm winters, etc., the beetle has hovered along this invisible barrier during its westward spread.

SOME BEES FROM UTAH

By T. D. A. Cockerell,
University of Colorado, Boulder, Colo.

Comparatively little is known of the bees of Utah, so I heard with great satisfaction that Professor Vasco M. Tanner and his associates at Brigham Young University were vigorously collecting and studying the Hymenoptera of their state. They will undoubtedly have a rich field for interesting discoveries. At the present time I record a small series of bees, many of them new to Utah, sent to me by Professor Tanner.

Nomada civilis Cress. ♀ 662 (Clarence Cottam)

Nomada (*Gnathias*) *bella* Cress. ♀ 1637 (C. J. D. Brown)

Triepeolus wyomingensis Ckll, 2♂, Sheep Creek, Duchesne Co.

These show that the black mark on first abdominal segment varies from a well defined transverse band, rounded at ends, to an irregular mark, broad in middle, but linear and partly broken laterally.

Triepeolus tanneri n. sp.

♂ Length about 10.5 mm.; robust, black, including mandibles, antennæ, tegulæ (except dark brown margin) and legs (except tarsi; dull red at apex), spurs black; ornaments cream-color; eyes light green, purplish only to a slight degree at extreme base; face narrow; a patch of glittering white hair lateral of each antenna; clypeus dull, minutely and densely granular-punctate all over; mesothorax strongly, more or less confluently punctured, glittering between the punctures; a pair of not very distinct dagger-shaped pubescent marks anteriorly, the base on anterior margin of mesothorax, approached by, but not touching pubescence of sides; scutellum strongly bigibbous; mesothorax dull, granular and rough, bare except a little hair at its upper end; wings very brown; abdomen with six even apical bands, and an anterior one, interrupted in middle, on first segment (the apical one on first almost interrupted);

black area on first segment a very broad (anteroposteriorly) but not very long transverse band, clean cut, with broadly rounded ends; band on second segment somewhat enlarged at sides, but with no anterior extension; venter black, not banded. Farr West, Utah (C. J. D. Brown). In my MS. table it runs to *T. lineatulus* Ckll., which differs at once by the transverse mark on pleura, the anterior extensions of band on second segment, the much longer black band on disc of first segment, etc. It runs out in all other tables.

Epeolus dacotensis Stevens. ♀ Sheep Creek, Duchesne Co., June 1926. Previously known from North Dakota.

Anthophora occidentalis Cress., ♂ Sheep Creek (Tanner, Cottam)

Anthophora urbana Cress., ♂ Springville (C. Lynn Hayward)

Melissodes alopex n. sp.

♂ Runs in my table (Tr. Am. Ent. Soc., 1906) to *M. menuacha* Cress., which it resembles in size and general appearance. It differs thus: pubescence in general much redder, fox-red on thorax and very bright on tibiæ and tarsi; third antennal joint shorter (its length about 990 microns); eyes darker green; wings strongly blackish, outer nervures black; second cubital cell very broad, not appreciably narrowing above; hind margins of abdominal segments not at all hyaline; second segment densely hairy at base, and with a median fulvous band; third to fifth with the exposed parts densely covered with fulvous hair, except broad apical margin of third, and narrow brownish margin of fourth; apex black haired.

Duchesne, Utah, July 1926 (Tanner) There is also a strong resemblance to *M. sabinensis* Ckll., from Arizona, but that has a broader, much more closely felted abdomen, and a much narrower face.

Melissodes agilis Cress. ♂ Zion National Park (Tanner)

Melissodes agilis aurigenia Cress., ♂ Zion National Park (Tanner)

Megachile sapellonis Ckll. ♀ Aspen grove near Timpanogas (Tanner) Described from New Mexico.

Megachile perihirta Ckll. ♂ Sheep Creek, June, (Tanner)

Megachile manifesta Cress. ♀ St. George, Aug. (Tanner)

Anthidium tenuiflorœ Ckll. ♂ Triplett Farm, Burnt Fork, June (Hayward); Summit Danials (*sic*) Canyon, 8000 ft., July (Hayward)

Alcidamea hypocrita Ckll. ♀ Wellsville Canyon, June (Brown)

Osmia lignaria propinqua Cress., ♀ Provo, April (Hayward); Wellsville Canyon, June (Hayward)

Osmia nassa Ckll. ♀ Summit Danials Canyon, 8000 ft., July (Hayward). In this specimen the thorax is dorsally black. Described from California.

Osmia melanotricha Lovell & Ckll. ♀ Triplett Farm, Burnt Fork, June (Hayward) Described from Maine.

Ceratina submaritima Ckll. ♀ Wellsville Canyon, June (Tanner) Known from the Pacific coast; I did not expect it so far inland.

Spinoliella scitula Cress., ♀ Fort Bridges, June (Hayward)

Agapostemon virescens Fabricius, ♀ Wellsville Canyon, June (Tanner)

Halictus lerouxii Lepeletier, ♀. No. 23. A small neat form, such as I have found at Florissant, Colo. Compared with Illinois material it looks distinct, but is surely the same species.

Halictus (Seladonia) meliloti Ckll. ♀ Provo, May (Hayward)

A TWO-EYED SPIDER FROM UTAH.

By Ralph V. Chamberlin,
University of Utah, Salt Lake City, Utah.

The highly interesting family Caponiidæ includes two African species, representing the genera Caponia and Diploglyna, and about a score of American species representing five genera. The American species hitherto known occur in the West Indies, northern South America and Central America, and in the desert region about the Gulf of California from where the writer has described species of three genera,—Orthonops, Tarsonops and Nopsides.[1] The genus Orthonops was established for the single species *O. overtus* Chamberlin the type of which was taken on San Luis Island, Gulf of California; but in April, 1928, Mr. Willis J. Gertsch, as a member of a field party from the University of Utah, secured a female of a second species of this genus in the San Rafael Desert region of Emery Co., Utah. This species, which is described below, is the only member of the family to have been found north of Mexico. Like all other American members of the family, excepting *Nopsides ceralbona* Chamberlin, this form has but two eyes, a feature not found in spiders of any other family. Along with other distinguishing peculiarities, the members of this family have all four spiracles leading into tracheal tubes, no book-lungs being present.

Orthonops gertschi, new species.

Female.—Carapace uniform light orange color, sparsely clothed with black hairs of moderate length which are all weakly curved. The sternum similar in color or slightly paler and bearing similar but more numerous hairs. Cheliceræ, labium and endites colored and clothed like sternum. Palpi yellow, the hairs, particularly on the tarsus more numerous, appressed. Legs clear yellow, clothed with dark hairs like those of palpi and carapace. Abdomen gray throughout, somewhat darker above,

[1]The Spider Fauna of the Shores and Islands of the Gulf of California, Proc. Cal. Acad. Sci., XII (4), No. 28, p. 597 et seq., 1924.

subdensely clothed with dark, appressed hairs similar to those of other parts of the body but mostly shorter and finer. The carapace depressed, the head region not set off by distinct furrows and no stria thoracica evident, subovate in outline; pars cephalica narrowed forward, with anterior corners widely rounded. Eyes on a somewhat darkened area; removed from anterior border of head, as viewed from above, by only slightly more than the length of the eye-row, though without measurement the distance appears greater; eyes circular, separated by less than their diameter, the light, pupillary areas separated in dorsal view by about their diameter. Labium rather broad, apically rounded. Endites rather long, bent over the labium and nearly meeting in the middle line in front of it. Cheliceræ with claws slender; upper margin of furrow with a low membrane over most of the length, the lower margin with a shorter but higher, distally rounded, membranous appendage. Sternum weakly convex, in outline subelliptic but more strongly narrowed caudad than cephalad, the caudal end acute. Abdomen narrowly elliptic or subfusiform, pointed at both ends. First and second legs decidedly more robust than the third and fourth, but the fourth longer than the first. All coxæ moderately long, the first and fourth longer than second and third. Paired claws of legs with six long teeth in single series. Unpaired claw on all legs well developed, smooth and untoothed. The appendage at base of tarsi I and II elongate, narrowly oblong in outline but distally pointed and somewhat curved. In leg I the tarsus is clavately thickened distad; its distal division, exclusive of claws, about half as long as the proximal division.

Total length, 4.75 mm. Length of cephalothorax, 1.9 mm.; width, 1.37 mm. Length of leg I (inclusive of coxa), 5.74 mm.; tib. + pat., 1.9 mm. Length of leg IV, 6.86 mm.; tib. + pat. IV, 2.1 mm.

Locality.—Utah: Emery Co., San Rafael Desert at Straight Wash., April, 1928. Holotype, a female, in author's collection.

Book Notices.

Destructive and Useful Insects. By C. L. Metcalf and W. P. Flint. McGraw Hill Book Co. New York. $7.50.

This book which includes 918 pages, with 561 illustrations, is an account of American insects as they affect the welfare of man. More than two-thirds of the text deals with the injurious and destructive activities of insects that affect agriculture, together with a consideration of general and special methods of combating them. This is the most valuable part of the book as it includes very full accounts of practically all the pests of importance which affect vegetable crops and fruits. With this is a chapter on household insects, one on insects that attack and annoy man and another on insects injurious to domestic animals. A chapter on the value of insects to man contains much interesting material which seldom receives space in entomological textbooks. There is also a brief treatment of the morphology and classification of insects. The illustrations are well selected, but are nearly all from other publications.

The authors are certainly to be congratulated in having gathered together a large mass of material into an extremely useful book, to which economic entomologist and others of their less practically inclined brethren will have frequent occasion to refer.

C. T. Brues.

Elementary Lessons on Insects. By James G. Needham. C. C. Thomas, Springfield Ill. and Baltimore Md. $2.00.

This small volume of somewhat over 200 pages gives an account of the structure and development of insects together with a consideration of some of their more important economic relations. It is suitable for secondary schools, or summer classes as a text-book and should be valuable as a *vade mecum* for teachers who require a certain amount of entomological knowledge for the teaching of "nature study."

Ten of the more important orders of insects are considered with general reference to their structure, development and habits.

Interpolated through this part of the book are numerous laboratory and field exercises, which cover a wide variety of subjects and material, much wider than it would be possible for the average class or teacher to complete, even during the summer time. It should be easy, however, to select a part of the exercises for which material and time might be available.

C. T. Brues.

PSYCHE

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